Evaluation of a System for Predicting the Amount of White Trunk Rot (Phellinus tremulae) in Aspen Stands

Introduction

During 1976, Anderson and Schipper (1978) developed a system for predicting the amount of white trunk rot in 45 to 50 year old aspen stands. The system involved multiplying the basal area of aspen having white trunk rot (Phellinus tremulae) conks by a hidden decay factor to determine the basal area of trees with rot but no conks (i.e. hidden rot). The basal area with conks and the basal area without conks were then summed to represent the total amount of rot in the stand. This quantity could then be used to predict the total rot in the stand after six years. To estimate the total stand rot in six years, the square feet of hidden rot would be added to the current square feet of total rot. The six year projection period was necessary because the average time for development of conks on an infected tree appeared to be six years. This report summarizes the results of a six year evaluation of the prediction system.

Objective

The objective of this evaluation was to determine the effectiveness of the white trunk rot prediction system.

Methods

Eleven of the original 18 plots were reexamined in 1982. The remaining seven plots were either cutover, blown down, or could not be relocated. Each plot had 85 tagged trees, which were reexamined whenever they could be identified. Data collected during the examination included: d.b.h., presence of white trunk rot conks,

presence of rot (determined by an increment boring at d.b.h.) and tree condition (i.e. live or dead).

Results and Discussion

Of the 11 plots examined, data from two plots was not used in the original evaluation; thus, they were eliminated from this evaluation. Results of the 1982 and 1976 evaluations are compared in Table 1. The percent trees with conks and those with hidden rot more than doubled in the six years since plot establishment. Total basal area on the plots declined on some plots because tree mortality exceeded growth.

Table 2 illustrates the differences between the basal area of predicted rot (i.e. applying the prediction system to the 1976 data) and what was actually measured after the six year interval. Although the basal area predictions vary substantially for most individual plots, the averages were not greatly different. The standard error of the mean was very large for predicted and actual decay, indicating wide variation among plots. When the predicted values were converted to percent total rot and compared to the actual percent rot, the individual plot variation was even more apparent. However, the average values for all stands sampled were again relatively similar.

In seven of the nine plots, predicted rot was less than the actual rot. Thus, the prediction system appears to underestimate the total amount of rot. This finding was in contrast to the assumption made in the original evaluation.

A second assumption used in developing the rot prediction system was that an average of six years is required between the time infection occurs and the first conks become visible. Of 79 trees that had hidden rot in 1976, only 12 developed conks by 1982. Apparently, it takes more

than six years, on the average, for conks to develop on rot-infected trees.

Conclusion

There appear to be a number of inconsistencies in the prediction system, which land managers should carefully consider before adopting its use. Individuals will have to determine the accuracy that is needed for their respective predictions. The trunk rot prediction system may have use in some stands and not in others.

Literature Cited

Anderson, Robert L.; Schipper, Arthur L., Jr. A system for predicting the amount of Phellinus (Fomes) igniarius rot in trembling aspen stands. USDA For. Serv. Res. Note NC-232. 1978. 4 p.

Forest and Plot No.	1976 Live Trees	1976 Trees with Conks	1976 Trees with Hidden Rot	1976 BA* with Conks	1976 BA with Hidden Rot	1976 Total BA	1982 Live Trees	1982 Trees with Conks	1982 Trees with Hidden Rot	1982 BA with Conks	1982 BA with Hidden Rot	1982 Total BA
	Number	Percent			Ft^2		Number	Percent			Ft^2	
Ottawa 1	85	8.2	17.6	3.9	6.0	28.9	60	26.7	35.0	6.8	9.0	26.6
Ottawa 2	85	4.7	4.7	1.4	.6	23.8	67	7.5	19.4	2.0	3.6	24.1
Ottawa 4	85	3.5	1.2	1.1	.2	19.1	63	6.3	31.7	1.3	4.8	18.8
Hiawatha 5	85	9.4	11.8	2.9	2.7	30.0	67	16.4	31.3	4.8	6.7	29.5
Chippewa 2	85	18.8	4.7	6.3	1.6	29.9	69	40.6	13.0	12.9	3.6	31.3
Chippewa 3	85	5.9	3.5	1.0	.9	21.3	60	21.7	10.0	3.4	.9	21.0
Chippewa 5	85	9.4	12.9	3.0	4.2	34.4	62	25.8	22.6	8.5	6.1	32.0
Chippewa 6	85	21.2	21.2	5.9	5.3	27.1	54	33.3	40.7	6.8	6.5	20.1
Chequamegon 3	85	5.9	15.3	2.8	3.1	29.4	66	18.2	13.6	6.7	3.5	29.6
Total or Ave.	765	9.7	10.3	3.1	2.7	27.1	568	21.7	23.8	5.9	5.0	26.0

*=Basal Area

Table 1.--Comparison of 1976 and 1982 data for nine plots evaluated in white trunk rot survey.

Forest and Plot No.	1976 Total Actual Rot	1982 Total Predicted Rot	1982 Total Actual Rot	1982 Total Basal Area	1982 Total Predicted Rot	1982 Total Actual Rot
	Ft.^{2} BA			Ft.^{2}	% BA	
Ottawa 1	9.9	10.8	15.9	26.6	41	60
Ottawa 2	2.0	4.0	5.6	24.1	17	23
Ottawa 4	1.3	3.0	6.0	18.8	16	32
Hiawatha 5	5.6	8.2	17.6	29.5	28	39
Chippewa 2	7.9	17.7	16.5	31.3	57	53
Chippewa 3	1.9	2.8	4.3	21.0	14	21
Chippewa 5	7.1	8.3	14.6	32.0	26	46
Chippewa 6	11.2	16.5	13.3	20.1	80	64
Chequamegon 3	5.8	7.7	10.2	29.6	26	35
Average	5.9	8.8	11.6	26.0	34	41
S_x	±4.6	±29.7	±26.5		± 7	± 5

Table 2.--Comparison of actual and predicted rot from 1976 to 1982 on nine plots evaluated in a white trunk rot survey.